

**SARDAR PATEL COLLEGE OF ENGINEERING**

(Government Aided Autonomous Institute)

Munshi Nagar, Andheri (W) Mumbai – 400058

*Re-Exam* SET II*B. Tech* **END SEMESTER EXAMINATION-MAY/JUNE 2025****Program: Civil Engineering**

Duration: 3 hr.

Course Code: PC-BTC-801

Maximum Points: 100

Course Name: Engineering Economics, Estimation & Costing**Semester: VIII****Notes:**

1. Q.1 is compulsory & attempt any four out of six remaining questions
2. Illustrate answer with neat sketches wherever required.
3. Make suitable assumptions where necessary and state them clearly.

23/6/25

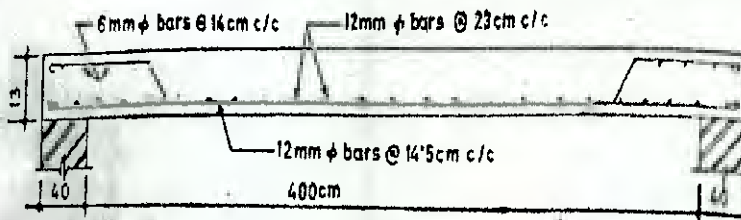
Q.No.	Questions	Marks	BL	CO	Module No
1.	A. Prepare detailed & abstract estimate of the following items from the given fig.1. 1. Excavation for foundation 2. Sand filling in plinth 3. BBCC in foundations (1:4:8) 4. 1st class Brick work in foundation & plinth in cement mortar (1:6) 5. 1st class Brick work in superstructure (1:6) 6. 12 mm thick sagole cement plaster cm (1:4) 7. 2.5 cm thick damp proof coarse 8. R.C.C work (Chajja & Slab) 9. Teak wood doors & windows & ventilator 10. Mosaic tiles flooring	20	III	4,5	3,4,5
2	A. Microeconomics Vs Macroeconomics B. Define: variable cost, overhead cost, sunk cost, marginal cost, opportunity cost. C. A company wants to set up a reserve which will help it to have an annual equivalent amount of Rs. 10, 00,000 for the next 20 years towards its employee's welfare measures. The reserve is assumed to grow at the rate of 15% annually. Find the single payment that must be made now to the reserve amount. D. Mr. Santosh is a writer of history novels. A movie company and a TV channel both want exclusive rights to one of his popular work. If he signs with TV channel, he will receive a single lump sum, but if he sign with Movie Company, the amount he will	05+05 05+05	II	1,2	1



receive depends upon the market response to his movie. What should he do?

Box office (prob.)	Movie Company Payout	TV channel payout (lump sum)
Small box office (0.3)	2,00,000	900000
Medium box office (0.6)	10,00,000	900000
Large box office (0.1)	30,00,000	900000

3	A. Prepare a detailed estimate of a Manhole from the given drawings and general specifications (Fig.2). General specifications: Foundation and floor concrete shall be of first class in 1: 4 cement mortar and inner faces of wall shall be pointed with 1:2 cement mortar. Inside channels and benching floor shall be finished with 20mm thick plastering with 1:3 cement mortar. B. Discuss the factors deciding the rate of items in rate analysis.	16+04	II	4,5	3,5
4	A. Prepare and detailed & abstract estimate of slab culvert as shown in Fig.3. The general specification as follows, 1. PCC in foundation (1:3:6) 2. PCC in 20 cm thick slab (1:1.5:3) 3. RCC coping in proportion (1:1.5:3) with steel reinforcement, centering, cutting etc. 4. 1st class brickwork in CM (1:6) B. Prepare a rate analysis for 12 mm thick plaster with CM (1:6) (Assume plastering area=200 Sq.m)	12+08	II	4,5	3,5
5	A. Prepare and detailed, abstract estimate & Bar Bending Schedule for RCC slab (4 x 5.5 m) shown in fig. Also workout the percentage volume of reinforcement. (6mm Θ bars = 0.22kg/m, 12mm Θ bars=0.89kg/m)	16+04	II	4,5	3,5



B. Define: Specifications. Discuss any three principles of specifications in tender documents.

6

- A. What do you mean by termination of contract? Discuss the situations when contracts get terminated.
- B. What do you mean by prequalification? State its advantages & Disadvantages.
- C. Define: Unbalanced tender. Explain unbalanced tender with an example

08+08
+04

I,II

5

6

7

- A. Discuss the objectives & provisions of Workmen compensatory Act, 1923.
- B. Define: Mass Haul Diagram.
Reduced level (RL) of ground along the center line of a proposed road from chainage 320 to 560 are given below. Formation width of road is 12m and the side slope of filling are 2:1 and 1.5:1 for cutting. The road formation has a uniform falling gradient is 1 in 200 at 320 chainage. Draw a mass haul diagram and Prepare an estimate of earthwork at the rate of Rs350/cum.

Chainage	320	350	380	410	440	470
RL on GL	116.60	117.25	117.40	116.85	116.50	115.25

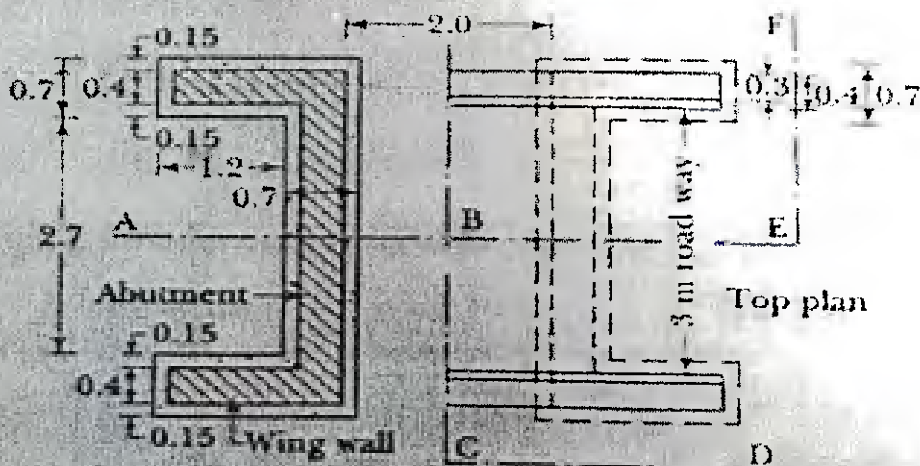
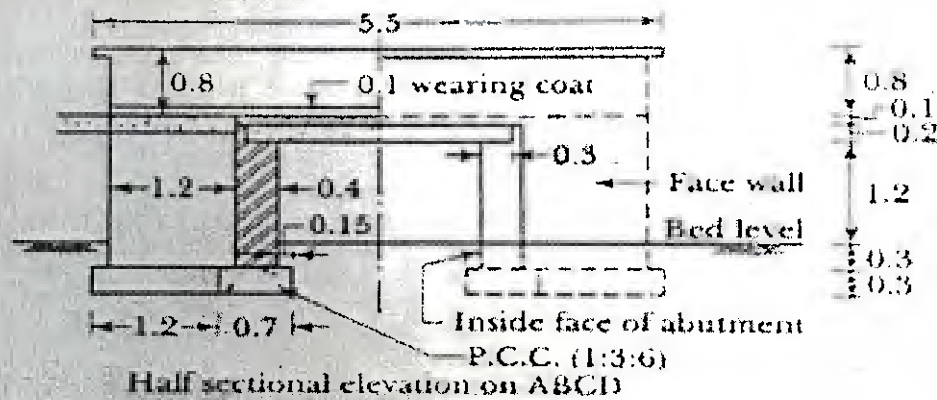
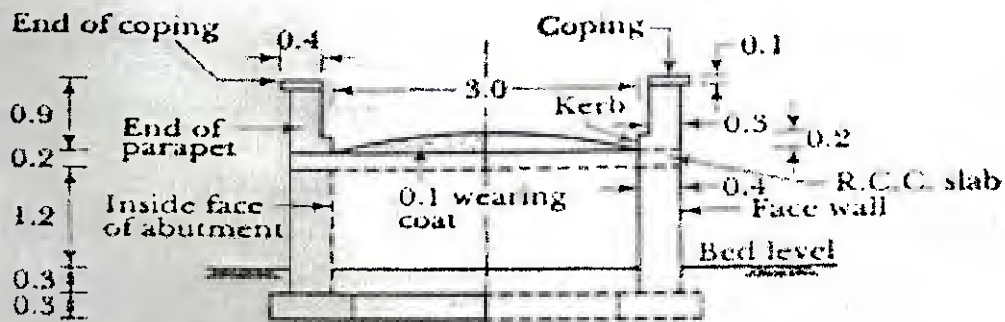
Chainage	500	530	560
RL on GL	114.80	115.15	115.20

08+12

III

04

4,7



All dimensions are in meters
Scale : 1 cm = 1 m

Fig. 3.



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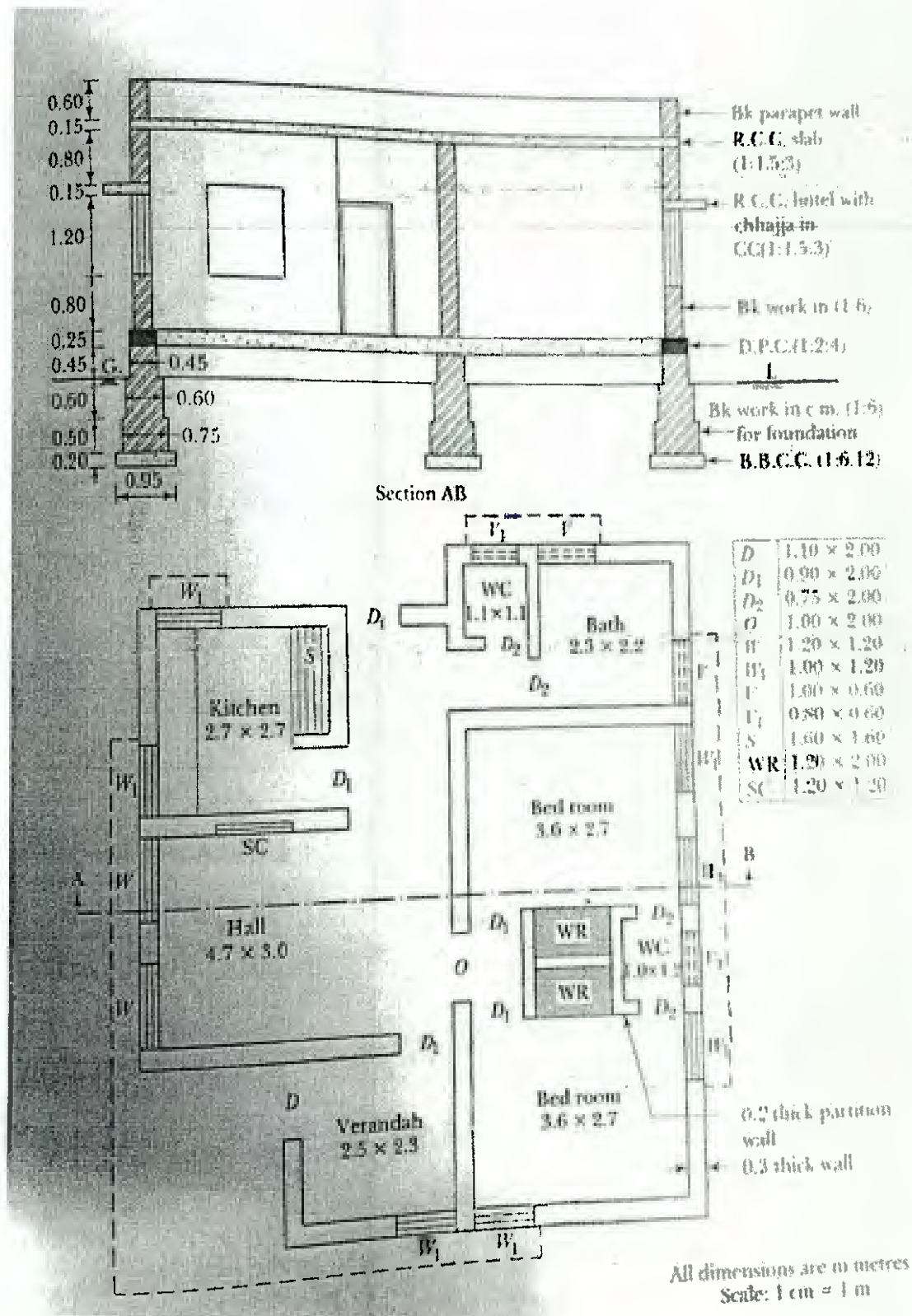


Fig: 1



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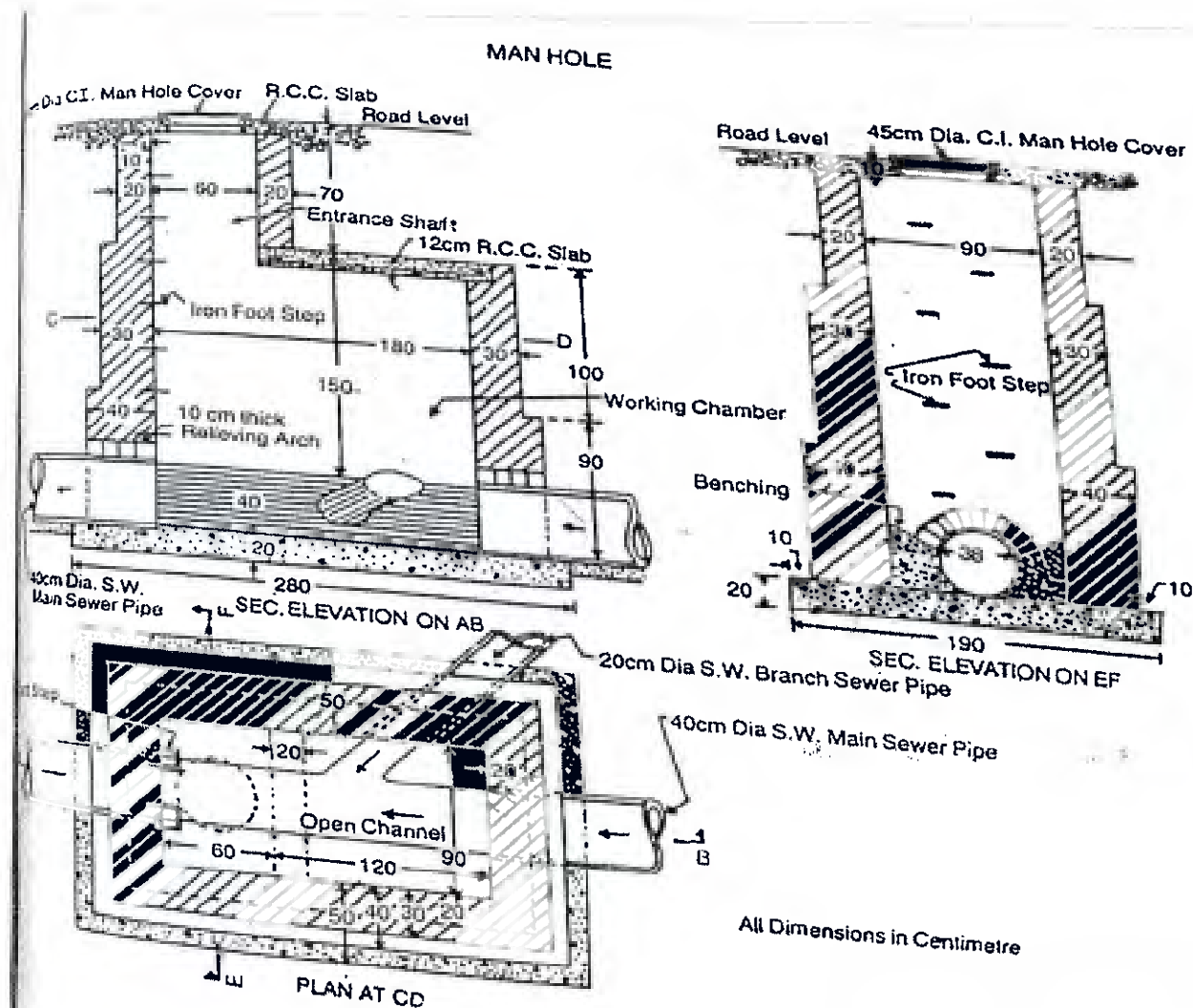


Fig: 2

Sr. No.	Item	Per	Rate
1	Excavation	Cu.m	200.00
2	BBCC	Cu.m	3000.00
3	1 st class brickwork	Cu.m	3500.00
4	2 nd class brickwork	Cu.m	2500.00
5	Cut cement pointing, plastering, centering work for beam/column, DPC	Sq.m	200.00
6	Teak wood door/window	Sq.m	5500.00
7	Mosaic tile flooring	Sq.m	500.00
8	RCC	Sq.m	1500.00
9	HYSD steel bars & Mild steel	Kg	65.00
10	Head mason	day	450
11	mason	day	350
12	majdoor	day	200
13	bhisti	day	200



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SET I

~~DE~~ / END SEMESTER EXAMINATION MAY/JUNE 2025

Program: Civil Engineering

5-Full Civil Sem VIII

Duration: 3 hr.

Course Code: PC-BTC-801

Maximum Points: 100

Course Name: Engineering Economics, Estimation & Costing

Semester: VIII

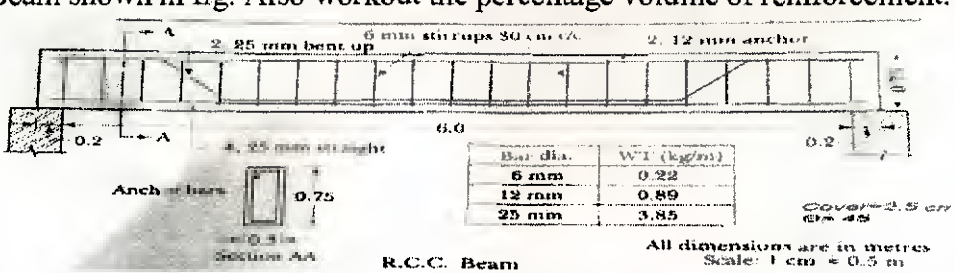
Notes:

1. Q.1 is compulsory & attempt any four out of six remaining questions
2. Illustrate answer with neat sketches wherever required.
3. Make suitable assumptions where necessary and state them clearly.

14/5/25

Q.No.	Questions	Marks	BL	CO	Mod No						
1.	A. Prepare detailed & abstract estimate of the following items from the given fig.1. 1. Excavation for foundation 2. Sand filling in plinth 3. BBCC in foundations (1:4:8) 4. 1st class Brick work in foundation & plinth in cement mortar (1:6) 5. 1st class Brick work in superstructure (1:6) 6. 12 mm thick sagole cement plaster cm (1:4) 7. 2.5 cm thick damp proof coarse 8. R.C.C work (Chajja & Slab) 9. Teak wood doors & windows & ventilators 10. Mosaic tiles flooring	20	III	4,5	3,4,5						
2	A. Define: Engineering Economics. Discuss any four advantages of engineering economics to civil engineer. B. Define: variable cost, overhead cost, sunk cost, marginal cost, opportunity cost. C. A company has to replace a present facility after 15 years at an outlay of Rs. 5, 00,000. It plans to deposit an equal amount at the end of every year for the next 15 years at an interest rate of 18 per cent, compounded annually. Find the equivalent amount that must be deposited at the end of every year for the next 15 years. D. Determine the best decision with probabilities assuming (0.7 for good condition) and (0.3 for bad condition) for the following scenario <table><tr><td></td><th colspan="2">States of the nature</th></tr><tr><th>Decision</th><th>Good Condition</th><th>Bad Condition</th></tr></table>		States of the nature		Decision	Good Condition	Bad Condition	05+05 05+05	II	1,2	1
	States of the nature										
Decision	Good Condition	Bad Condition									



		Expand	8,00,000	5,00,000				
		Maintain as it is	13,00,000	-1,50,000				
		Sell now	3,20,000	3,20,000				
3	A. Prepare a detailed estimate of a Septic tank with Soak-pit for 25 users from the given drawings, Fig.2 Septic tank shall be of first class brickwork in 1:4 cement mortar the foundation and floor shall be of 1:3:6 cement concrete. Inside of septic tank shall be finished with 12mm cement plaster and floor shall be finished with 20 mm cement plaster with 1:3 mortar mixed with standard water proofing compound. Upper and lower portion of soak-pit shall be of second class brickwork in 1:6 cement mortar and middle portion shall be of dry brickwork. Roof covering slabs and baffle wall shall be of precast R.C.C. The length' of the connecting pipe from latrine seat may be taken as 3 m. B. Define: Rate Analysis. Discuss any three necessities of rate analysis in construction projects.				16+04	II	4,5	3,5
4	A. Prepare and detailed & abstract estimate of pier of culvert as shown in Fig.3. The general specification as follows, 1. BBCC (1:4:8) 2. 1st class brickwork in CM (1:6) 3. Cut cement pointing to exposed surface CM (1:1) B. Prepare a rate analysis for first class brickwork in superstructure with CM (1:6) (Assume Volume of brickwork=20 Cu.m)				12+08	II	4,5	3,5
5	A. Prepare and detailed, abstract estimate & Bar Bending Schedule for RCC Beam shown in fig. Also workout the percentage volume of reinforcement.  B. Define: Specifications. Discuss any three purposes for giving specifications in tender documents.				16+04	II	4,5	3,5
6	A. What do you mean by conditions in contract? Discuss the special & general conditions of contracts. B. What do you mean by prequalification? State its advantages & Disadvantages.				08+08 +04	I,II	5	6

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C. Define: Earnest money, Security Deposit, liquidity damages, settlement of disputes.

A. Discuss the objectives & provisions of Minimum Wages Act, 1948.

B. Define: Mass Haul Diagram.

Reduced level (RL) of ground along the center line of a proposed road from chainage 10 to 20 are given below. The formation level at 10th chainage is 108 m and the road is downward gradient of 1 in 150 up to the chainage 14 and then the gradient changes to 1 in 200 downward. Formation width of road is 12m and the side slope of banking are 2:1 of the chain is 30m. Draw a mass haul diagram and Prepare an estimate of earthwork at the rate of Rs350/cum.

Chainage	10	11	12	13	14	15
RL on GL	106	106.60	106.44	106.90	106.42	105.30

Chainage	16	17	18	19	20
RL on GL	106.00	105.10	105.62	105.00	104.30

08+12

III

04

4,7

Sr. No.	Item	Per	Rate
1	Excavation	Cu.m	200.00
2	BBCC	Cu.m	3000.00
3	1 st class brickwork	Cu.m	3500.00
4	2 nd class brickwork	Cu.m	2500.00
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7	Mosaic tile flooring	Sq.m	500.00
8	RCC	Sq.m	1500.00
9	HYSD steel bars & Mild steel	Kg	65.00
10	Head mason	day	450
11	mason	day	350
12	majdoor	day	200
13	bhisti	day	200

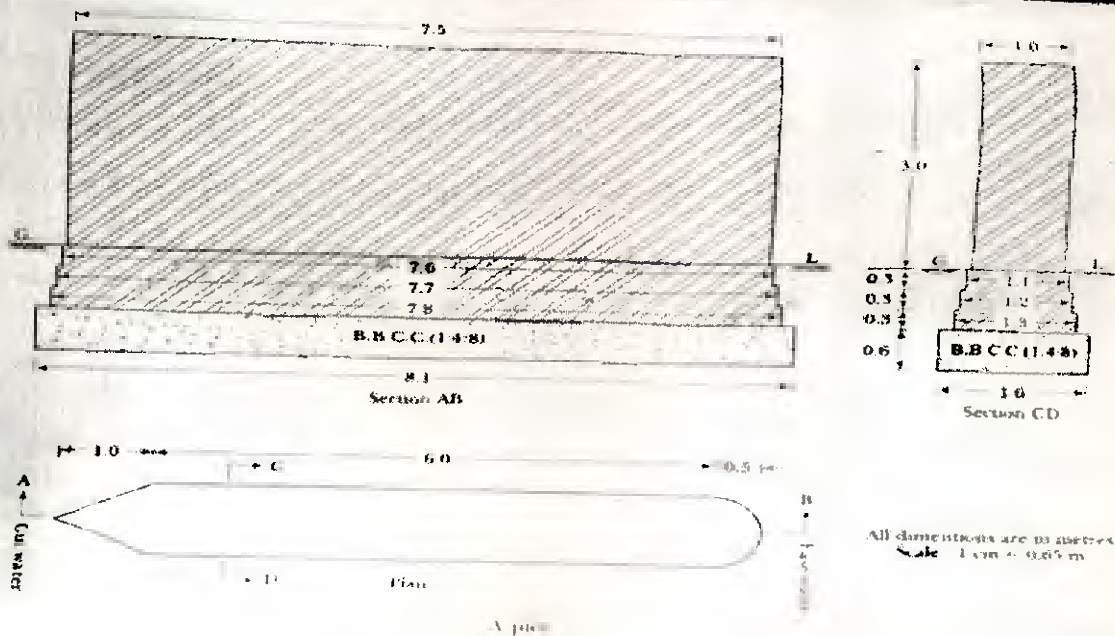


Fig: 3

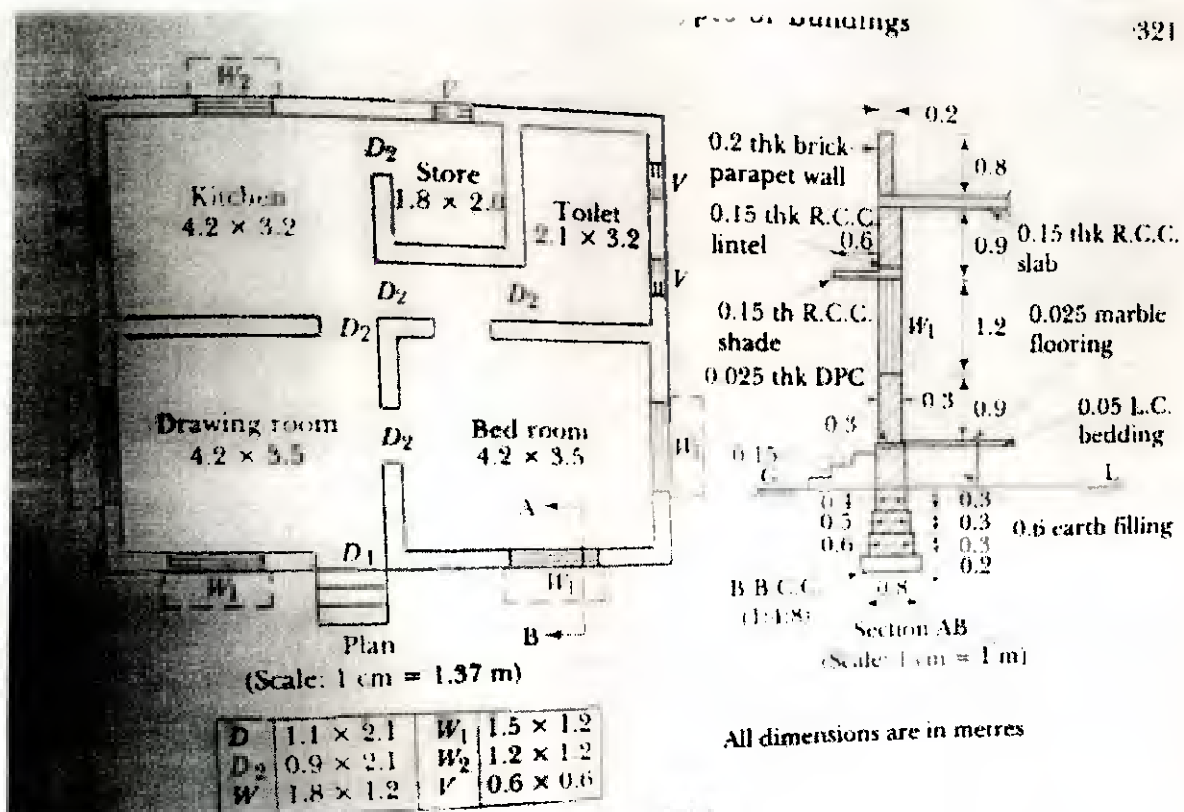


Fig. 1

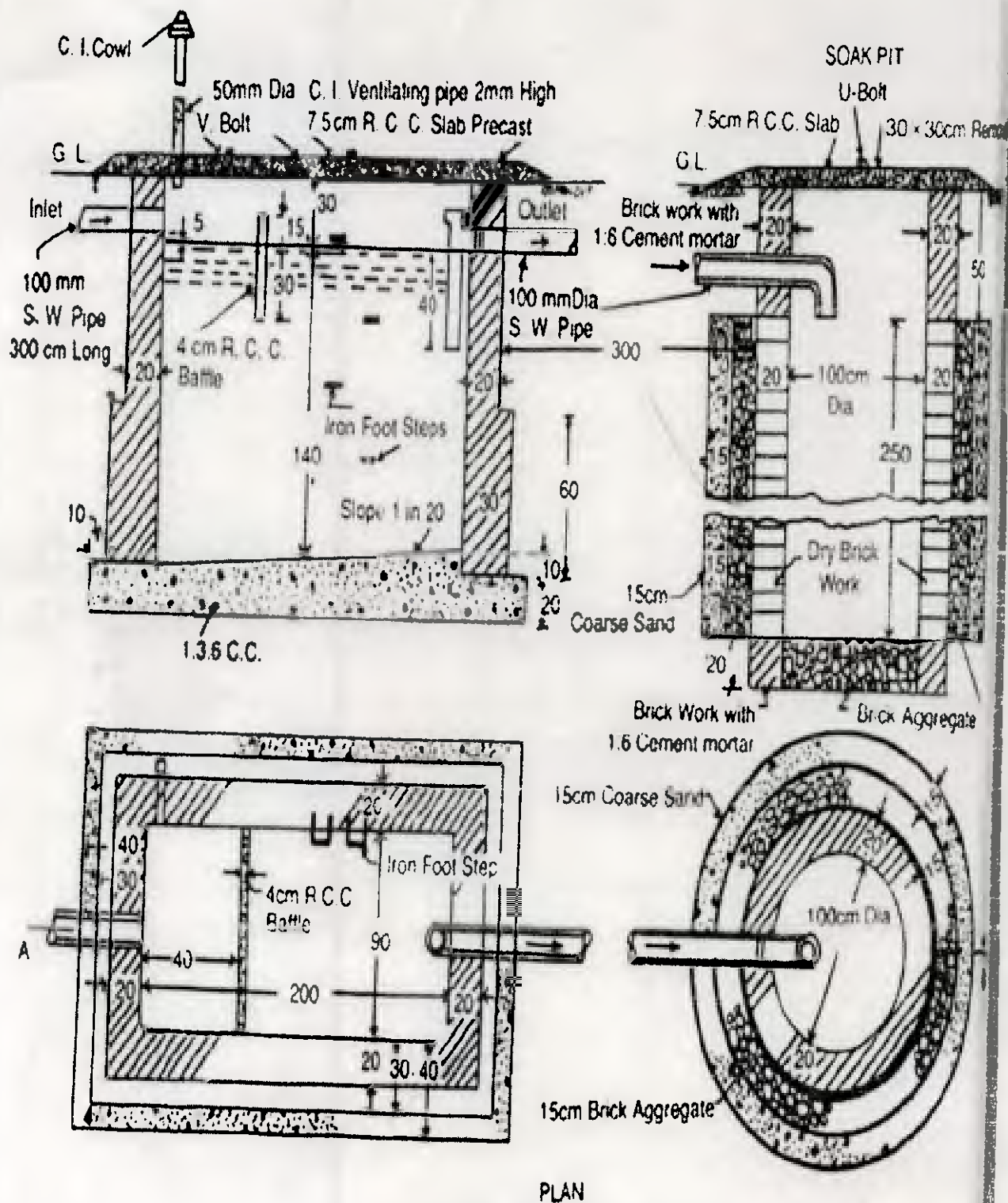
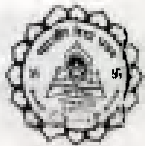


Fig - 2



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End Semester/Re-exam Exam
June ~~May~~ 2025-R18

Max. Marks: 100

Class: B. Tech

Name of the Course: Environmental Impact Assessment

Course Code: OE BTC815

Duration: 3 hrs

Semester: VIII

Program: Civil /Mech/Elec

Instructions:

- Question seven (7) is compulsory. Solve any four from remaining five
- Draw neat sketches/diagrams wherever required and wherever design is asked.
- Assume suitable data if necessary and state them clearly
- Figure on right indicate maximum points for the given question, course outcomes attained, Bloom's Level and Performance Indicators
- You require to use a device to be used as a camera so that invigilation can be done.
- All the best

Q1	Answer the following questions (any 4)	Marks (20) (5*4Q)	CO 1-4	BL 2
(a)	Explain the indicators considered in Socio economic impact assessment			
(b)	Enumerate mitigation measures to be taken up for soil pollution and soil erosion			
(c)	Explain biotic impact assessment			
(d)	Explain significant activity, baseline and Terms of Reference			
(e)	Methodology to conduct water impact assessment			
Q2	Answer the following questions	(20)	1-4	2
(a)	Fill in the blanks	(1*5)		
i.	The _____ refers to the original environmental conditions existing at a given moment before a change			
ii.	The _____ is the natural or juridic person or organisation interested in the development of a project			
iii.	The _____ is one of the most important tools in order to incorporate an environmental point of view into the decisions to be taken by the project from the investment perspective			
iv.	The _____ category project require full scale EIA.			
v.	_____ identifies the issues that are likely to be of most importance during the EIA and eliminates those that are of little concern			

(b)	A new national highway is to be constructed in mountainous region of Ladakh and an EIA is to be conducted. The main terrain is of sedimentary rocks and it is a valley area of Nubra which has an eco-sensitive zone. Answer the following questions (i)Mention and explain three environmental impacts of this activity (ii)Mention and explain three mitigation measures you will propose as part of your EMP to mitigate the impacts identified ? (iii) Explain the monitoring and mitigation plan for the same	(15)	1-4	4
Q3	Answer the following questions (any 4)	(20) (5*4Q)	1-4	4
(a)	Explain the phenomenon of noise pollution. Find Ldn levels for following data 14 hrs of day data noise levels (measured at 2 hrs interval in dbA units) are : 65, 70, 90,75,64,70,75. 10 hrs of night data noise levels(measured at 2 hrs interval in dbA units) are: 35, 40, 38, 40, 30.			
(b)	Write down the chapters with explanation to be included in EIA report			
(c)	Steps for environmental clearance with time lines			
(d)	Compare EIA notification 2006 with notification draft of 2020			
(e)	Where and how Index of quantitative variation of ethnicity used?			
Q4	Answer the question	(20)	2-4	4
(a)	A solid waste management facility is started in Navi Mumbai where recovery of metals, plastic and other inert materials will be done followed by composting of organic material. The site is close to a lake and also is close to ecosensitive zone. What all clearances will be required. As an EIA coordinator design the steps with details regarding environmental impacts, mitigation and monitoring plan			
Q5	Answer the questions	(20)	1-4	2
(a)	State True or false with reasoning (Reasoning to be given for both true or false)	(10) (2*5Q)		
(i)	Specific detailed engineering design shall not be required at the EIS review stage.			
(ii)	If there is available and relevant secondary data to a development proposal, the Env. Impact review committee should require additional primary sampling.			
(iii)	Data on natural hazards are required to be presented in the EIS.			

(iv)	Recommendation of internationally acceptable methods for quantitative assessments should be done during the Scoping stage of the EIA process			
(v)	The monitoring reports are to be submitted every two months as per EIA notification			
(b)	Explain stability of atmosphere? How does it impact dispersion of air pollutants? Write down mitigation measures adopted for air pollution and explain any two	(10)	1-4	4
Q6	A thermal power project is to be set up in Jharkahand and an EIA is to be conducted. The main terrain is of sedimentary and metamorphic rocks and there are two major rivers passing by the terrain. Also the area is near 10 villages where a population of 30000 people are living. As an EIA coordinator for the project which is the clearances you require to apply for? How would the entire EIA study will be planned with number and type of experts you need to hire. Explain major steps of the study, with environmental impacts, mitigation and monitoring plan for the same.	(20)	1-4	4
Q7	Explain in detail the project undertaken by your group as part of final presentation of EIA coursework. What were the relevant findings?	(20)	1-4	4
ALL THE BEST				



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End Semester/Re-exam Exam

May 2025 – R18

Max. Marks: 100

Class: B. Tech

Name of the Course: Environmental Impact Assessment

Course Code: OE BTC815

Duration: 3 hrs

Semester: VIII

Program: Civil /Mech/Elec

Instructions:

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- Assume suitable data if necessary and state them clearly
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- You require to use a device to be used as a camera so that invigilation can be done.
- All the best

		Marks	CO	BL
Q1	Answer the following questions (any 4)	(20) (5*4Q)	1-4	4
(a)	Compare EIA notification 2006 with notification draft of 2020			
(b)	Explain design of an air impact assessment study			
(c)	Explain in short the steps in EIA study			
(d)	Explain methods used for selecting a project for investing			
(e)	Where and how Index of quantitative variation of ethnicity used?			
Q2	Answer the following questions	(20)	1-4	2
(a)	Fill in the blanks	(1*5)		
i.	The _____ refers to the original environmental conditions existing at a given moment before a change			
ii.	The _____ is the natural or juridic person or organisation interested in the development of a project			
iii.	The _____ is one of the most important tools in order to incorporate an environmental point of view into the decisions to be taken by the project from the investment perspective			
iv.	The _____ category project require full scale EIA.			
v.	_____ identifies the issues that are likely to be of most importance during the EIA and eliminates those that are of little concern			
(b)	A new national highway is to be constructed in mountainous region of Uttarakhand and an EIA is to be conducted. The main	(15)	1-4	4

	terrain is of sedimentary rocks and there are two major rivers passing by the terrain. Answer the following questions (i)Mention and explain three environmental impacts of this activity (ii)Mention and explain three mitigation measures you will propose as part of your EMP to mitigate the impacts identified ? (iii) Explain the monitoring and mitigation plan for the same			
Q3	Answer the following questions (any 4)	(20) (5*4Q)	1-4	5, 6
(a)	Explain concept of Leq. Find Leq for 10 hrs if one reading is taken per hour 70dBA, 80dBA, 72dBA, 78dBA, 76dBA, 75dBA, 70dBA, 82dBA, 81dBA, 90dBA. Use the following formula to find Leq			
(b)	Methodology to conduct noise assessment			
(c)	Steps for environmental clearance with time lines			
(d)	Explain the indicators considered in Socio economic impact assessment			
(e)	Methodology to conduct water impact assessment			
Q4	Answer the question	(20)	1-4	3-4
(a)	A new airport is coming up in a city which is financial hub and which is close to sea (away from the main city) but the project will improve the connectivity globally. There are two rivers at the site and mangroves. An environmental impact study is to be conducted and you are the co-ordinator for EIA team. How would you go about designing and conducting the study. What can be the probable impacts and what would be the mitigation measures. Design Environmental management plan for the same.			
Q5	Answer the questions	(12)	1-4	3-4
(a)	State True or false with reasoning (Reasoning to be given for both true or false)	(5) (1*5Q)		
(i)	Impact assessment is done for the planned project and the identified alternatives.			
(ii)	Frequency of monitoring report to be submitted will be determined by the nature of the project			
(iii)	Recommendation of internationally acceptable methods for quantitative assessments should be done during the Scoping stage of the EIA process			
(iv)	The EIA evaluation must be done after the issuance of permits and clearances.			
(v)	An EIA is a process a proponent undertakes before an Environmental clearance is issued.			

(b)	A chemical (Benzene and derived products) a company has been operating for several years (more than 10 yr) in a terrain with the following characteristics: porous, filterable with a phreatic level near to the surface (1.5 m depth). The company is located close by to an river estuary branch which is quite useful for them since they discharge all the disposals and waste generated by this activity directly into the estuary. These disposals contain a high level of carcinogenic chemicals. All the discharges goes directly into the soil since there are no sewers or gutters. The company operates for 20hrs for seven days per week. The Municipality since the local people has complained has arranged the execution of an EIA and you are a part of it. (i) Mention and explain three environmental impacts of this activity (ii) Mention and explain three mitigation measures you will propose as part of your EMP to mitigate the impacts identified ? Device a monitoring and management plan for the same	(15)	1-4	3-4
Q6	A hydropower and irrigation project is to be constructed in mountainous region of Uttarakhand near Tehri region and an EIA is to be conducted. The main terrain is of sedimentary and metamorphic rocks and there are two major rivers passing by the terrain. As an EIA coordinator for the project which is the clearances you require to apply for? How would the entire EIA study will be planned with number and type of experts you need to hire. Explain major steps of the study, with environmental impacts, mitigation and monitoring plan for the same.	(20)	1-4	3-4
Q7	Explain in detail the project undertaken by your group as part of final presentation of EIA coursework. What were the relevant findings.	(20)		
ALL THE BEST				



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END-SEM / RE-EXAM EXAMINATION MAY / JUNE 2025

Program: Final Year B. Tech Civil Engineering

Sem VIII Duration: 3 Hrs.

Course Code: PE-BTC824

Maximum Points: 100

Course Name: Finite Element Analysis

Semester: VIII

Instructions for the Students:

1. Attempt any 05 (FIVE) questions
2. Assume suitable data if necessary and state it clearly.
3. Illustrate your answers with neat sketches wherever required.

27/6/25

Q. No.	Questions	Points	CO	BL	Module No.
1 a	Write short note on convergence, compatibility requirements and geometric invariance.	10	1	2	2
1 b	Determine the interpolation functions for the element as shown in the figure 1.	10	2	4	3
2 a	Derive a stiffness matrix for a CST element having joint coordinates as follows: Node 1 (0,0), Node 2 (2 m, 0), Node 3 (0, 2 m). Assume the element as plane stress element with thickness of 0.020 m, $E = 200$ GPa and $\nu = 0.2$.	10	2	4	3,5
2 b	For the simply supported beam as shown in figure 2, determine the maximum displacement using variational approach.	10	1,2	4	1
3 a	Determine the nodal load vector for a four noded rectangular element as shown in figure 3. Note that the element is subjected to a concentrated load of 30 kN in X direction acting at point and 40 kN in Y direction acting at point B.	10	2	4	3,5
3 b	For the simply supported beam as shown in figure 4, determine the maximum displacement using finite difference techniques.	10	1,2	4	1
4	For the truss shown in figure 5, using finite element techniques, determine member stiffness matrix, structure stiffness matrix, effective structure stiffness matrix, loading vector, displacement vector, element forces and vector of element stresses and strains.	20	1,2	4	3,4
5	For the continuous beam shown in figure 6, using finite element techniques, determine element stiffness matrix, structure stiffness matrix, effective structure stiffness matrix, loading vector, displacement vector and member forces.	20	1,2	4	3,4



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END SEM / RE-EXAM EXAMINATION MAY / JUNE 2025

6	For the truss shown in figure 7, using finite element techniques, determine member stiffness matrix, structure stiffness matrix, geometric stiffness matrix and buckling load for the truss.	20	1,2	4	3,6
7	For the Fixed beam shown in figure 8, using finite element techniques, determine member stiffness matrix, structure stiffness matrix, consistent mass matrix and first two natural frequencies.	20	1,2	4	3,7

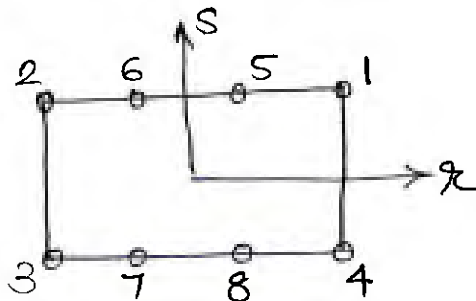


Figure - 1

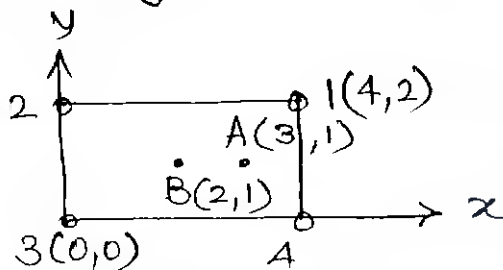
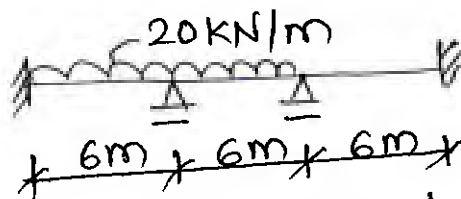
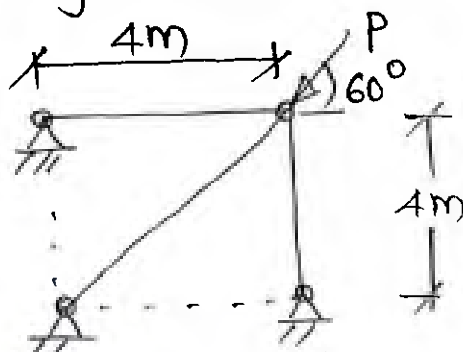


Figure - 3



$EI = \text{Constant}$

Figure - 6



$EA = \text{constant}$

$E = 200 \text{ GPa}$
 $A = 1000 \text{ mm}^2$

Figure - 7

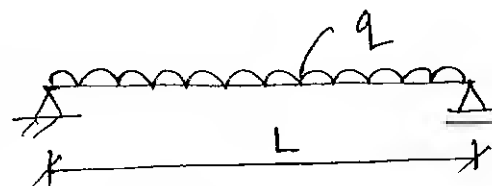


Figure - 2

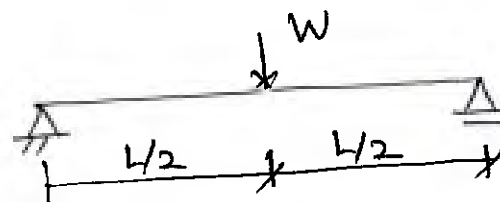
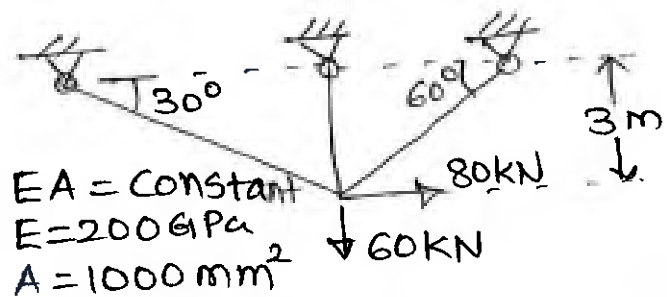


Figure - 4.



$EA = \text{Constant}$
 $E = 200 \text{ GPa}$
 $A = 1000 \text{ mm}^2$

Figure - 5.

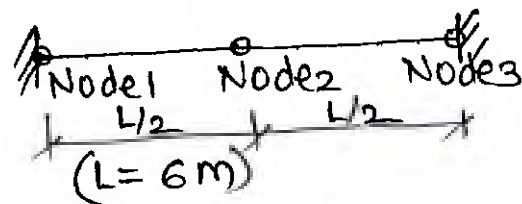


Figure - 8

**SARDAR PATEL COLLEGE OF ENGINEERING**

(Government Aided Autonomous Institute)
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**END SEM / RE-EXAM EXAMINATION MAY / JUNE 2025****Program: Final Year B. Tech Civil Engineering****Duration: 3 Hrs.****Course Code: PE-BTC824****Maximum Points: 100****Course Name: Finite Element Analysis****Semester: VI****Instructions for the Students:**

1. Attempt any 05 (FIVE) questions
2. Assume suitable data if necessary and state it clearly.
3. Illustrate your answers with neat sketches wherever required.

20/5/25

Q. No.	Questions	Points	CO	BL	Module No.
1 a	Explain the step-by-step procedure of solving problems using finite element method.	10	1	2	2
1 b	Determine the interpolation functions for the element as shown in the figure 1.	10	2	4	3
2 a	Derive a stiffness matrix for a CST element having joint coordinates as follows: Node 1 (0,0), Node 2 (1 m, 0), Node 3 (1 m, 1 m). Assume the element as plane strain element with thickness of 0.020 m, $E = 200$ GPa and $\nu = 0.2$.	10	2	4	3,5
2 b	For the simply supported beam as shown in figure 2, determine the maximum displacement using variational approach.	10	1,2	4	1
3 a	Determine the nodal load vector for a four noded rectangular element as shown in figure 3. Note that the element is subjected to a concentrated load of 30 kN in X direction acting at point and 40 kN in Y direction acting at point B.	10	2	4	3,5
3 b	For the simply supported beam as shown in figure 4, determine the maximum displacement using finite difference techniques.	10	1,2	4	1
4	For the truss shown in figure 5, using finite element techniques, determine member stiffness matrix, structure stiffness matrix, effective structure stiffness matrix, loading vector, displacement vector, element forces and vector of element stresses and strains.	20	1,2	4	3,4
5	For the continuous beam shown in figure 6, using finite element techniques, determine element stiffness matrix, structure stiffness matrix, effective structure stiffness matrix, loading vector, displacement vector and member forces.	20	1,2	4	3,4



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END SEM / RE-EXAM EXAMINATION MAY / JUNE 2025

6	For the truss shown in figure 7, using finite element techniques, determine member stiffness matrix, structure stiffness matrix, geometric stiffness matrix and buckling load for the truss.	20	1,2	4	3,6
7	For the Fixed beam shown in figure 8, using finite element techniques, determine member stiffness matrix, structure stiffness matrix, consistent mass matrix and first two natural frequencies.	20	1,2	4	3,7

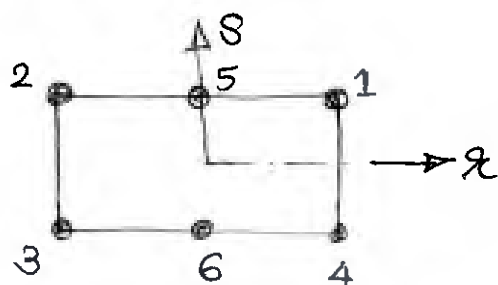


Figure - 1

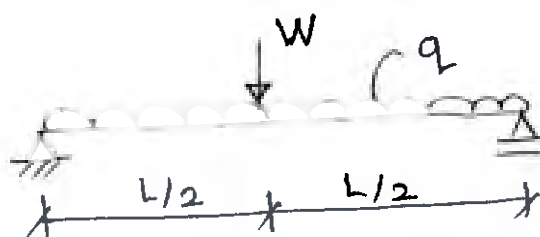


Figure - 2

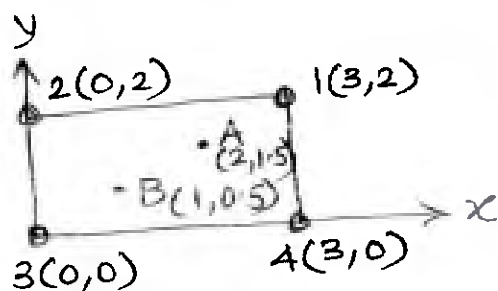


Figure - 3

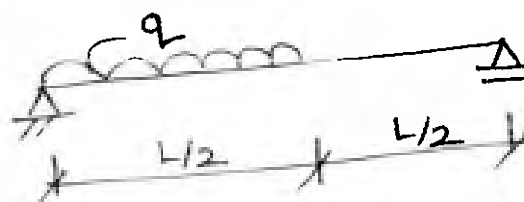


Figure - 4

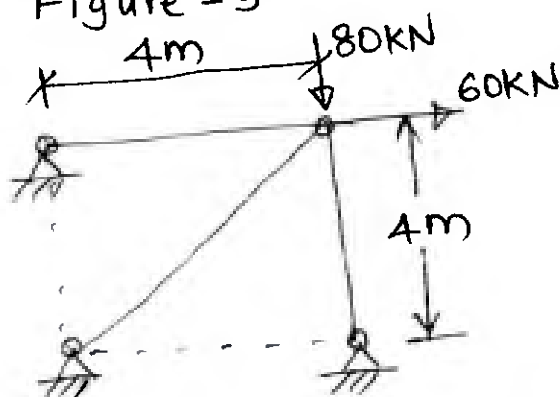


Figure - 5

Note $EA = \text{constant}$
 $E = 200 \text{ GPa}$
 $A = 1000 \text{ mm}^2$

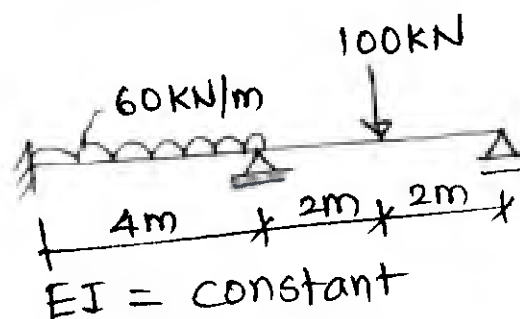


Figure - 6

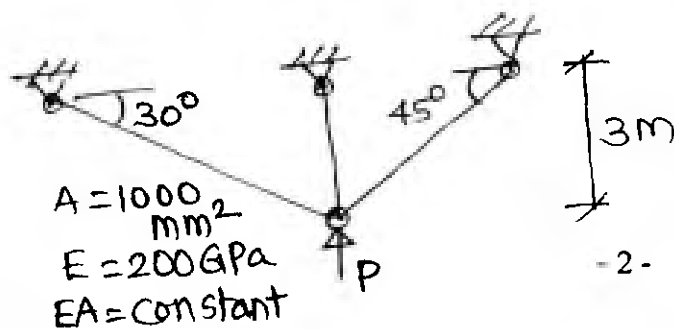


Figure - 7

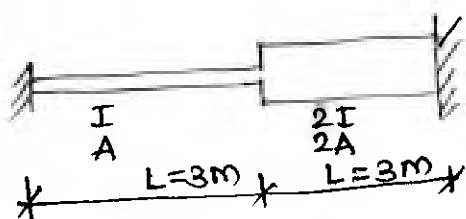


Figure - 8



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End Semester /Re- Examination

May/June 2025 (R18)

Program: UG Final Year

Course Code: PE-BTC684

Course Name: Ground Improvement Techniques

Duration: 3 Hours

Maximum Points: 100

Semester: VIII

Notes:

- **Question 1 is compulsory. Attempt any four out of remaining six questions**
- Assume **suitable data** if necessary and **state it clearly**
- Clearly write units everywhere. Points will be deducted in each place units are missing
- Figure on right indicate **maximum points** for the given question, **course outcomes attained**, and **Bloom's Taxonomy Level**

Q.			Points	CO	BL
1	a	Describe any two soils considered problematic for construction and explain why they are considered so.	5	3	2
	b	Illustrate with a neat sketch a unit cell for stone column and explain the terms area improvement ratio and stress ratio	5	1	3
	c	What is a MSEW? Discuss how they are a better green solution compared to RCC gravity walls	5	2	2
	d	Discuss the limitations of soil nails for slope stabilization	5	2	2
2	a	What is lime fixation? Discuss the type of soil for which it is suitable and factors controlling its characteristics.	5	1	2, 3
	b	Discuss advantages and disadvantages of grouting.	5	1	2
	c	An industrial unit is to be constructed at a site. Site investigations show 9 m of medium dense silty sand below GS. However, densification is required at the site. Design a suitable ground improvement technique. Assume any suitable data needed. Several tables/charts/values are available on page 2, 3 and 4.	10	1, 3, 4	3, 4
3	a	Discuss various objectives of ground improvement.	5	4	3, 4
	b	What are the external failure modes possible for a MSEW? Illustrate with neat sketches.	5	2	3, 4
	c	A 12 m thick NC clay layer sandwiched between sand layers, has the following properties: $C_c = 0.78$, $e_0 = 2.1$ and $C_v = 13 \text{ m}^2/\text{year}$. If the existing effective overburden pressure at the centre of the clay is 185 kPa and expected pressure from proposed construction is 110 kPa, determine the primary consolidation settlement of the clay layer without pre-compression. If the primary consolidation is to be restricted to 18 months, determine the surcharge required assuming soil density of engineered fill as 19 kN/m^3 . What if consolidation is required to be complete within 9 months? Several tables/charts/values are available on page 2, 3 and 4.	10	1, 4	3, 4



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4	a	Analyze the suitability of deep mixing technique of ground improvement based on soil type (suitability). Discuss various patterns and applications of each pattern.	10	1, 3	3
	b	Discuss the process of shotcreting in detail. Briefly discuss new trends in shotcreting	10	1	2
5	a	Calculate the number of passes required for a compaction production of 150 m ³ /hour if the compactor width is 1.2m, average efficiency factor is 85% and it travels at 1.5 kmph over a lift thickness of 30 cm. Rate the suitability of soil having $D_{10} = 0.1$ mm, $D_{30} = 1.18$ mm and $D_{50} = 4.25$ mm to be used as backfill material for vibro-replacement. Brown's rating chart is provided below.	5	1, 3	3

Suitability Number	Rating
0 to 10	Excellent
10 to 20	Good
20 to 30	Fair
30 to 40	Poor
>50	Unsuitable

	b	Illustrate a multi-stage well point and state its suitability	5	1, 3	2
	c	Explain some emerging trends in the following ground improvement techniques: soil densification by compaction, dynamic compaction and addition of binders/admixtures to soil	10	1	2
6	a	Explain the terms unit cell, area replacement ratio and stress ratio of a stone column	5	1	2
	b	Briefly explain suitability of jet grouting and its applications	5	3	2
	c	Discuss how geosynthetics can be used as ground improvement tools	5	2	2, 3
	d	Differentiate between soil nails and rock anchors	5	2	3, 4
7	a	Discuss how rammed piers are different from stone columns Explain the process of top feed method of stone column construction.	10	4	3
	b	How does separation function of geosynthetics help in ground improvement? Compare granular filter with geotextile filter	10	2, 4	3, 4

Data:

PVDs available in the Indian market:

TECHDRAIN TD3520F: 4.10mm x 100 mm

TECHDRAIN: 5mm x 100 mm



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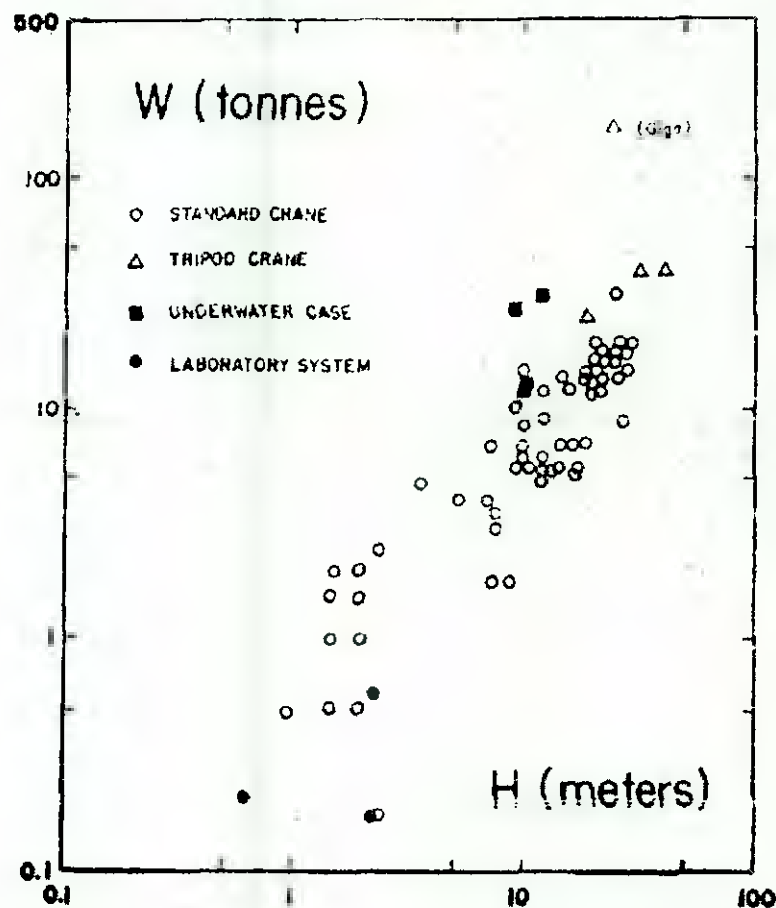
Contractors assure construction using these PVDs give soil disturbance factor as 1.08 and well resistance factor = 0.04

Table 1

Drop method	Free drop	Rig drop	Mechanical winch	Hydraulic winch	Double hydraulic winch
C	1.0	0.89	0.75	0.64	0.5

Table 2

Soil type	Unit applied energy (kJ/m ³)
Pervious coarse grained soil	200 to 250
Semi-pervious fine grained soil	250 to 350
Landfills	600 to 100



Tampers available with diameter: 2m, 4m and 5m with weight 5Mg, 10Mg and 20Mg in all combinations (ex. 2 m dia, 5Mg, 10Mg and 20Mg all possible)

Figure 1



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Figure 2: (Question 5 a)

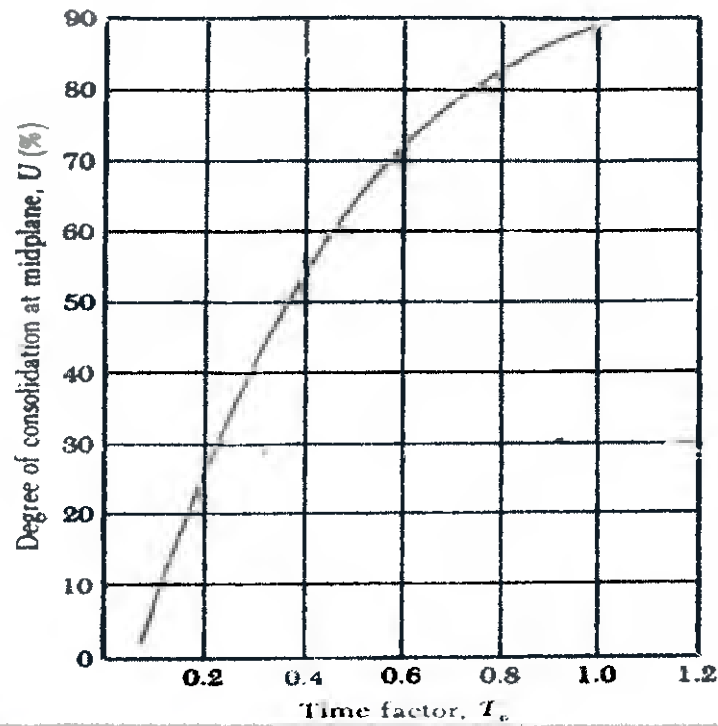


Figure 2

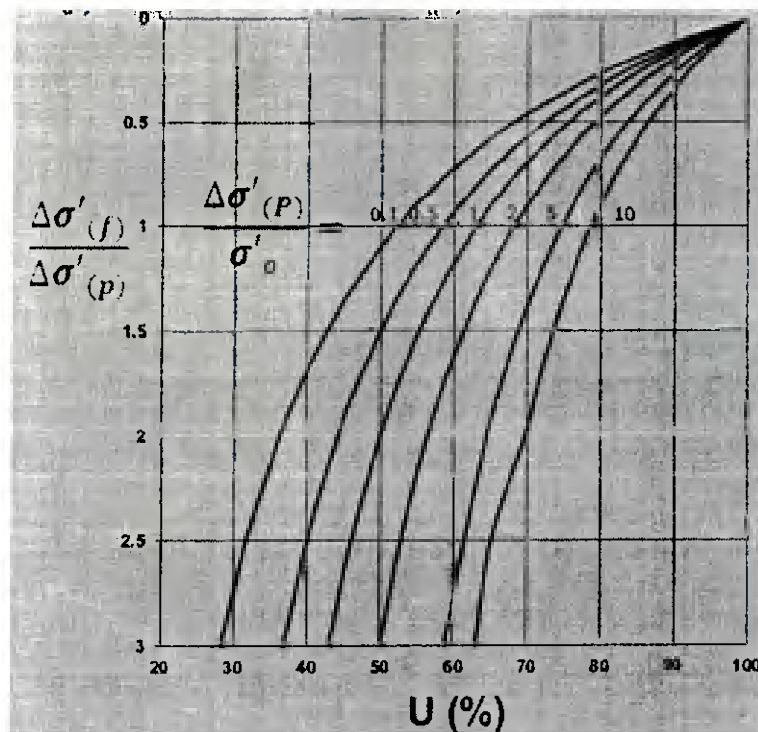


Figure 3



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End Semester /Re-Examination

May/June 2025 (R18)

Program: UG Final Year

Course Code: PE-BTC664 264

Course Name: Ground Improvement Techniques

Duration: 3 Hours

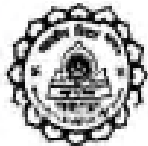
Maximum Points: 100

Semester: VIII

Notes:

- Question 1 is compulsory. Attempt any four out of remaining six questions
- Assume **suitable data** if necessary and state it clearly
- Figure on right indicate **maximum points** for the given question, course outcomes attained, and Bloom's Taxonomy Level

Q.		Points	CO	BL
1	a	5	3	2
	b	5	1	3
	c	5	2	2
	d	5	2	2
2	a	5	1	2, 3
	b	5	1	2
	c	10	1, 3, 4	3, 4
3	a	5	4	3, 4
	b	5	2	3, 4
	c	10	1, 4	3, 4
4	a	10	1, 3	3



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		based on soil type (suitability). Discuss various patterns and applications of each pattern.			
	b	Compare the dry mix process for shotcreting with wet mix process	10	1	2
5	a	Calculate the rating and suitability of vibro-replacement technique for a soil having a grain size distribution curve shown in Figure 2	5	1, 3	3
	b	Describe the advantages of a well point system	5	1	2
	c	Explain some emerging trends in the following ground improvement techniques: soil densification by compaction, dynamic compaction and addition of binders/admixtures to soil	10	1	2
6	a	Explain the terms unit cell, area replacement ratio and stress ratio of a stone column	5	1	2
	b	A highway embankment is planned at a site where 9 m clay with coefficient of consolidation of $0.035 \text{ cm}^2/\text{min}$ exists. If the work is to begin within 18 months assuming 85% consolidation should be complete before work begins, design the PVDs assuming soil is homogeneous. Assume $C_h = 1.5C_v$. Use the data given on pages 2 to 4 as required.	5	3	2
	c	Prepare a step-wise plan for a contractor to construct a MSEW	5	2	2, 3
	d	Convince the associated government agency to use soil nails for a highway widening project in place of a conventional retaining wall	5	2	3, 4
7	a	Discuss various solutions for construction of an embankments over soft soils. Illustrate with sketches, the various failure modes if basal mattress is placed beneath the embankment.	10	4	3
	b	A shallow foundation is to be designed to carry loads of a G+5 storey structure. However, the bearing soil needs strength improvement. Geogrids are available near the site at low cost. Explain bearing capacity ratio and discuss the factors affecting it.	10	2, 4	3, 4

Table 1

Drop method	Free drop	Rig drop	Mechanical winch	Hydraulic winch	Double hydraulic winch
C	1.0	0.89	0.75	0.64	0.5

Table 2

Soil type	Unit applied energy (kJ/m ³)
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Landfills	600 to 1000

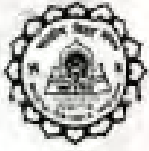
PVDs available in the Indian market:

TECHDRAIN TD3520F: 4.10mm x 100 mm and TECHDRAIN: 5mm x 100 mm

Contractors assure these give soil disturbance factor as 1.08 and well resistance factor = 0.04

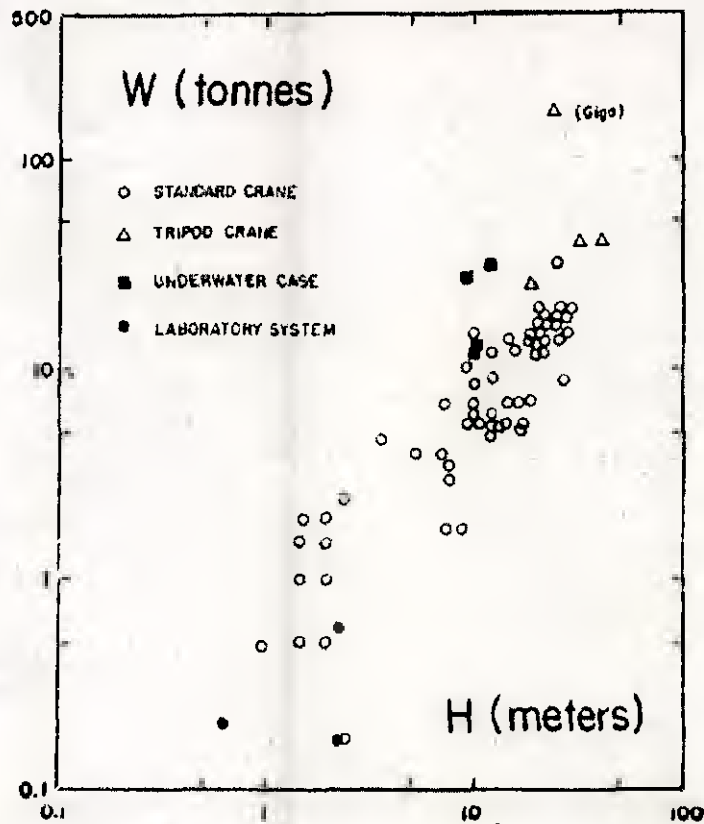
$$t = \frac{d_c^2}{8c_h} [F(n) + F_s + F_r] \ln \left[\frac{1}{1 - U_h} \right]$$

$$F(n) = \ln \left(\frac{d_c}{d_w} \right) - 0.75$$

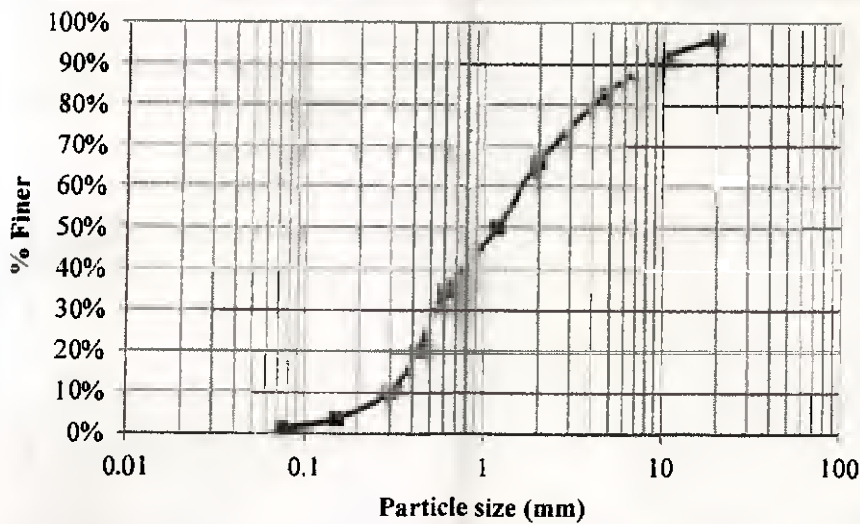


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Tampers available with diameter: 2.5m, 4m and 5m with weight 5Mg, 10Mg and 20Mg in all combinations (ex. 2.5 m dia, 5Mg, 10Mg and 20Mg all possible)



Sieve opening (mm)	% finer
20	96%
10	92%
4.75	83%
2	66%
1.18	50%
0.6	34%
0.425	20%
0.3	10%
0.15	3%
0.075	1%

Figure 2: (Question 5 a)



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Degree of consolidation, U_c (%)	Time factor, T_v , for values of n				
	5	10	15	20	25
37	0.0541	0.0912	0.1139	0.1302	0.1429
38	0.0560	0.0943	0.1178	0.1347	0.1479
39	0.0579	0.0975	0.1218	0.1393	0.1529
40	0.0598	0.1008	0.1259	0.1439	0.1580
41	0.0618	0.1041	0.1300	0.1487	0.1632
42	0.0638	0.1075	0.1342	0.1535	0.1685
43	0.0658	0.1109	0.1385	0.1584	0.1739
44	0.0679	0.1144	0.1429	0.1634	0.1793
45	0.0700	0.1180	0.1473	0.1684	0.1849
46	0.0721	0.1216	0.1518	0.1736	0.1906
47	0.0743	0.1253	0.1564	0.1789	0.1964
48	0.0766	0.1290	0.1611	0.1842	0.2023
49	0.0788	0.1329	0.1659	0.1897	0.2083
50	0.0811	0.1368	0.1708	0.1953	0.2144
51	0.0835	0.1407	0.1758	0.2020	0.2206
52	0.0859	0.1448	0.1809	0.2068	0.2270
53	0.0884	0.1490	0.1860	0.2127	0.2335
54	0.0909	0.1532	0.1913	0.2188	0.2402
55	0.0935	0.1575	0.1968	0.2250	0.2470
56	0.0961	0.1620	0.2023	0.2313	0.2539
57	0.0988	0.1665	0.2080	0.2378	0.2610
58	0.1016	0.1712	0.2138	0.2444	0.2683
59	0.1044	0.1759	0.2197	0.2512	0.2758
60	0.1073	0.1808	0.2258	0.2582	0.2834
61	0.1102	0.1858	0.2320	0.2653	0.2912
62	0.1133	0.1909	0.2384	0.2726	0.2993
63	0.1164	0.1962	0.2450	0.2801	0.3075
64	0.1196	0.2016	0.2517	0.2878	0.3160
65	0.1229	0.2071	0.2587	0.2958	0.3247
66	0.1263	0.2128	0.2658	0.3039	0.3337
67	0.1298	0.2187	0.2732	0.3124	0.3429
68	0.1334	0.2248	0.2808	0.3210	0.3524
69	0.1371	0.2311	0.2886	0.3300	0.3623
70	0.1409	0.2375	0.2967	0.3392	0.3724
71	0.1449	0.2442	0.3050	0.3488	0.3829
72	0.1490	0.2512	0.3134	0.3586	0.3937
73	0.1533	0.2583	0.3226	0.3689	0.4050
74	0.1577	0.2658	0.3319	0.3795	0.4167
75	0.1623	0.2735	0.3416	0.3906	0.4288
76	0.1671	0.2816	0.3517	0.4021	0.4414
77	0.1720	0.2900	0.3621	0.4141	0.4546
78	0.1773	0.2988	0.3731	0.4266	0.4683
79	0.1827	0.3079	0.3846	0.4397	0.4827
80	0.1884	0.3175	0.3966	0.4534	0.4978



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SET I

~~RE~~ / END SEMESTER EXAMINATION-MAY/JUNE 2025

Program: Civil Engineering

Duration: 3 hr.

Course Code: PE-BTC-842

Maximum Points: 100

Course Name: Environmental Law & Policy

Semester: VIII

Notes:

1. Q.1 is question compulsory & solve any four out of remaining six
2. Illustrate answer with neat sketches wherever required.
3. Make suitable assumptions where necessary and state them clearly.

Q.No.	Questions	Marks	BL	CO	Module No.
1.	Solve any four : 1. Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) 2. Make a list of Aichi Biodiversity Targets. 3. Stockholm Convention, 1989. 4. Sources for international environmental law. 5. Causes of air pollution.	20	1	1,2	1-6
2	A. Discuss the Water (Prevention & Control of Pollution) act, 1974 in detail. B. Write a short note on necessity of Environmental Law & Indian Constitution.	10+10	2	1,3	2
3	A. Explain shortly the following principles of international environmental law. • Principle of State Sovereignty • Principle of Good Neighborliness • Principle of Common Heritage of Mankind • Principle of Co-operation and Integration • Common but Differentiated Responsibilities (CBDR) B. Discuss the salient features of Environmental Protection Act, 1986. (any five) C. Write a short note on : Kigali Agreement	10+05 +05	2	1,2	1
4	A. What is The United Nations Convention on the Law of the Sea (UNCLOS)? Discuss the various CRZ classifications in along with their criteria's as well as restricted activities. B. Discuss the Nagoya Protocol on Access to Genetic	10+06 +04	2	1,2	2,4



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	Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization under CBD. C. Write a short Note on : Minamata Convention				
5	A. Write key features Solid waste management rules 2016 in detail. B. Discuss the various remedies and features evolved by the court from time to time to protect our environment.	10+10	2	1,2,3	2
6	A. Discuss the objectives of Convention on Biological Diversity. Also explain how Cartagena Protocol on Biodiversity seeks to protect biodiversity from the potential risks caused by LMOs arising from modern technology. B. Discuss the key elements of Paris Agreement. C. Discuss the outcomes of Rio-Earth Summit, 1992	10+05 +05	2	1,2,3	4
7	A. "Global Cities Tackle Climate Change"- They aren't waiting for national leadership to address rising global temperatures.- US news, Jun16,2024. Discuss the initiatives taken by UN under the Kyoto protocol B. "India commits to protect 30% land, marine area in upgraded biodiversity plan"- The Mint 3 Nov 2024. Discuss how the Biodiversity Act, 2002 help the Indian government to fulfil above commitments.	10+ 10	2	1,2	3



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END SEM/RE-EXAM EXAMINATION -MAY/JUNE 2025

Program: **Civil Engineering**

Duration: 3hr

Course Code: PE-BTC853

Maximum Points: 100

Course Name: Valuation & Value Engineering

Semester: VIII

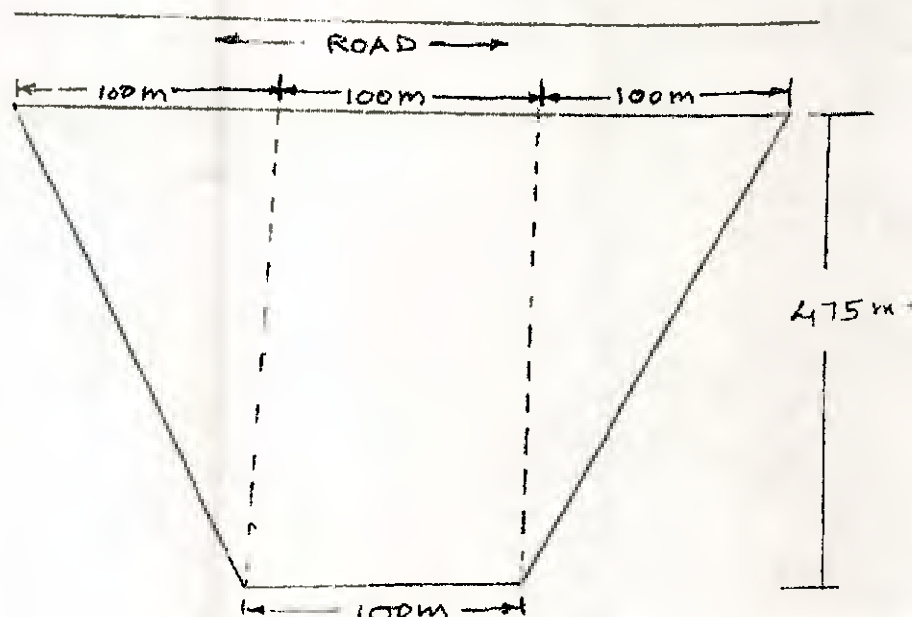
Instructions:

1. Question no. 1 is compulsory
2. Attempt any 4 questions out of remaining 6 questions.
3. Neat diagrams/cash flow diagram must be drawn wherever necessary.
4. Assume Suitable data if necessary and state it clearly.

201/225

Q. No.	Questions	Points	CO	BL	Module
1	a Compare by LCCA the alternative designs of a proposed road bridge superstructure.	15	CO2	BL2	7
	Design life of bridge= 75 years Alternative I: Steel Bridge of service life 75 years. Cost of construction ₹ 600 lakh spread over 2 years. There after no maintenance is envisaged for the first 5 years and regular maintenance for the balance service life @ ₹ 6 lakh per year. Salvage value = 30% of initial cost. Alternative II: Pre-stressed concrete bridge with anticipated life of 40 years. The initial cost of construction is ₹ 500 lakh spread over 2 years. There after no maintenance is envisaged for the first 5 years and regular maintenance for the balance service life @ ₹ 9 lakh per year. No salvage value at the end of service life. To cover the design life of 75 years another pre-stressed concrete bridge is proposed to be constructed at the same place, after dismantling the first one having same maintenance schedule. Adopt 6% discount rate. The proposed bridge is expected to earn a revenue from toll tax @ ₹ 30 per vehicle with a low traffic density about 2000 vehicles/day. Also include in LCCA a reasonable cost due to traffic detour during construction of second pre-stressed concrete bridge. Discuss the observations from the comparison of LCCA.				
	b Differentiate valuation and value engineering.	5	CO1	BL1	1
2	a It is proposed to carry out valuation of a land & building enlist the documents required for the same.	4	CO1	BL2	6
	b It is proposed to implement VE in the context of highway construction project.	10	CO3	BL3	5
	Discuss the steps in the process of VE along with scope of value engineering for highway construction project.				
	c Differentiate between freehold and leasehold property, Market value and Book value.	6	CO1	BL1	1.4.1
3	a Discuss functions and utility of FAST diagram. Draw FAST diagram for pile foundation activity.	7	CO2	BL2	3

b	A construction company has received quotes for the modern paver block machine for which life is 7 year.	8	CO3	BL4	5															
	Assuming an average annual inflation of 10% for the next 7 years, determine the best machine based on the present worth method. Interest rate is 20% compounded annually.																			
	<table><tr><td>Details</td><td>Machine 1</td><td>Machine 2</td></tr><tr><td>Purchase Price in ₹</td><td>15,00,000.0</td><td>20,00,000.0</td></tr><tr><td>Salvage value in ₹</td><td>2,00,000.0</td><td>3,00,000.0</td></tr><tr><td>O & M Cost in ₹</td><td>3,00,000.0</td><td>2,50,000.0</td></tr></table>	Details	Machine 1	Machine 2	Purchase Price in ₹	15,00,000.0	20,00,000.0	Salvage value in ₹	2,00,000.0	3,00,000.0	O & M Cost in ₹	3,00,000.0	2,50,000.0							
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O & M Cost in ₹	3,00,000.0	2,50,000.0																		
c	Discuss the Speculation phase checklist in VEJP workshop.	5	CO2	BL2	4															
4	a	Workout the rent per annum of a property from the following details	8	CO2	BL2	4														
	(i) Cost of land ₹ 9,00,000/- (ii) Cost of construction ₹ 35,00,000/- (iii) Required return on land is 7% (iv) Required return on building is 8% (v) Estimated life of building is 50 years (vi) Rate of interest on sinking fund is 5% (vii) Annual repairs are ₹ 20,000/- (viii) Outgoings are 25% of gross rent (ix) Scrap vale of building 10%																			
	b	For the procurement of equipment two brands are available as A and B Investment for Brand A=₹ 6,50,000/- and Investment for Brand B=₹ 8,25,000/-.	8	CO2	BL3	3														
5	Which brand of equipment should the contractor choose at the interest rate 10% compounded annually?																			
	<table><tr><td rowspan="2">Option</td><td colspan="3">Saving details year wise ₹</td></tr><tr><td>1</td><td>2</td><td>3</td></tr><tr><td>A</td><td>2,25,000.00</td><td>2,25,000.00</td><td>2,25,000.00</td></tr><tr><td>B</td><td>3,00,000.00</td><td>3,00,000.00</td><td>3,00,000.00</td></tr></table>					Option	Saving details year wise ₹			1	2	3	A	2,25,000.00	2,25,000.00	2,25,000.00	B	3,00,000.00	3,00,000.00	3,00,000.00
	Option	Saving details year wise ₹																		
1		2	3																	
A	2,25,000.00	2,25,000.00	2,25,000.00																	
B	3,00,000.00	3,00,000.00	3,00,000.00																	
c	How you will proceed to determine fair value of 5 years old building in a Mumbai city	4	CO2	BL2	3															
5	a	Hindustan Construction Company has 3 mutually exclusive project alternatives for expanding their Business. Each alternative has insignificant salvage value at the end of its life.	8	CO3	BL3	2														
	The details are as given below. Life is 10 years																			
	<table><tr><td>Project</td><td>Initial cost ₹</td><td>Annual Maintenance cost ₹</td></tr><tr><td>I</td><td>25,00,000</td><td>8,00,000</td></tr><tr><td>II</td><td>20,00,000</td><td>6,00,000</td></tr><tr><td>III</td><td>30,00,000</td><td>10,00,000</td></tr></table>					Project	Initial cost ₹	Annual Maintenance cost ₹	I	25,00,000	8,00,000	II	20,00,000	6,00,000	III	30,00,000	10,00,000			
Project	Initial cost ₹	Annual Maintenance cost ₹																		
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III	30,00,000	10,00,000																		
Assuming an interest rate of 20% compounded annually, find the best project alternative for expanding the business operation of the company using annual equivalent method,																				
b	Define roadblocks and discuss with examples their importance in value engineering.	6	CO1	BL1	5															

	c	Differentiate i) Market value and Book value ii) Scrap value and salvage value	6	CO1	BL1	
6	a	Discuss importance of depreciation in the context of valuation of building and construction equipment.	6	CO1	BL2	4
	b	Define value and discuss Aesthetic value and Ergonomic Value.	4	CO1	BL2	1
	c	Find the value of the entire plot by belting method of valuation of a land.	10	CO3	BL4	5
		If the width of the first belt is 100 m and its value is estimated as ₹ 4000 per sq. m.  Rear side of the Plot				
7	a	Discuss in detail various phases in value engineering job plan.	8	CO2	BL3	3
	b	Explain in detail the outgoings during possession and maintenance of a property.	8	CO2	BL2	2
	c	Discuss the importance of depreciation and obsolescence in the context of valuation process.	4	CO1	BL2	1



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End Semester Exam/Re-exam- May 2025 Examinations

Program: B.Tech Civil Engg.

sem VIII

Duration: 3 Hours

Course Code: PE-BTC822

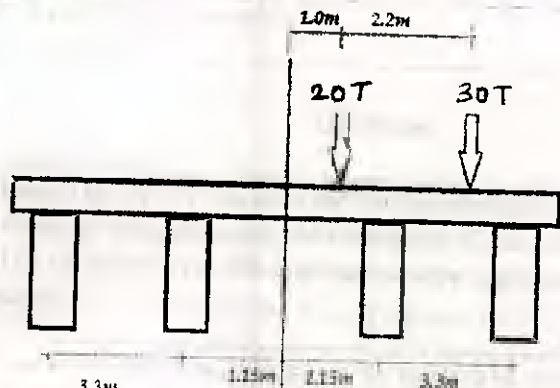
Maximum Points: 100

Course Name: Bridge Engineering

Semester: VIII

- Notes: 1) Attempt any 5 main questions
2) Assume suitable data if missing and mention the same clearly
3) Draw neat sketches wherever possible
4) Use of IRC 6 and IRC 112 is allowed

21/9/25

Q.No.	Questions	Points	CO	BL	Module
1.a)	Explain the various load cases and load combinations to be considered for design of superstructure and substructure of a road bridge as per IRC 112. Illustrate the possible combinations to be considered with neat sketch.	10	1	2	2,4
1.b)	Explain the data to be collected and the points to be considered during the planning and conceptual design of a bridge	10	3	2	1
2.a)	Design an RC slab culvert for a clear span of 5m and a carriageway of 8.5m. Wearing coat is of 75mm thickness. Consider IRC Class 70R tracked vehicle loading. SIDL = 7.5kN/m ² Use M30 and Fe500	14	1,4	4	3
2.b)	Explain the assumptions in Courbon's method of load distribution to girders. Using Courbon's method, obtain the forces transferred to each girder as shown below 	06	1,3	2	3
3	For a simply supported steel truss bridge of span 25m, determine a suitable arrangement of truss members for a through type bridge. The maximum depth of truss is limited to 4.5m. Assume total dead load per nodal point = 160kN Deck width = 8.5m The truss is to be designed for Class 70R tracked vehicle loading. Design the bottom chord member at midspan (assume builtup section and provide necessary checks). Use E250 grade steel	20	4	4	5

4.a)	Enlist the various methods of long span bridge construction. Explain incremental launching technique (elaborate the effect of construction method on design forces, special provisions required for construction stages, etc) Draw neat sketch to illustrate the stages of construction in this method	14	4	4	7
4b)	A simply supported bridge span of 18m is supported on a single fixed (FX) and free bearing (FR) at each end. The width of carriageway is 3.5m. Calculate the braking forces for Class A wheeled vehicle plying on the span. If the reaction from dead load on each bearing is 900kN, what are the longitudinal forces on the bearings? (Assume that the supports are unyielding, $\mu=0.05$)	06	1,3	2	2
5.a)	Explain the components of POT-PTFE bearing with a neat sketch. Explain the suitability, advantages and disadvantages of providing POT-PTFE bearings.	10	3	2	6
5.b)	Evaluate the axial load and moment carrying capacity for a pier having following data : Size : 1150mm x 1150mm Reinforcement on each face = 6nos-32mm dia(each face) Effective cover = 60mm Assume N.A = 525mm from extreme compression fibre Concrete grade is M50 and steel grade is Fe500.	10	4	4	6
6.a)	Obtain the maximum bending moment and maximum shear force for a girder of span 16m subjected to two class A wheeled vehicles and having a combined courbon factor of 0.45	07	1	4	3
6.b)	Design an RCC girder of span 16m as per IRC 112 with following specifications: UDL on girder due to footpath and crash barrier = 6kN/m UDL on girder due to wearing course = 3.5kN/m Live load as per Q.6(a) Effective slab width as beam flange = 2m Depth of slab = 0.2m Use M35 and Fe500	13	4	4	3
7	Design a shallow foundation as per IRC 112 for a pier of size 1.05m x 1.05m. The design axial load = 3500kN and design moment along transverse axis = 1100kNm. SBC of soil = 120kN/m ² . Use M40 and Fe500. Provide checks for : a) Flexure b) One way shear c) Punching shear at distance 2 x depth of footing from face of pier and at face of pier	20	4	4	6

**END SEM/RE-EXAM EXAMINATION -MAY/JUNE 2025**Program: B.Tech Civil Engineering *Sum VIII*

Duration: 3 Hrs.

Course Code: PE-BTC852

Maximum Points: 100

Course Name: PE-VI Contracts Management

Semester: VIII

Notes:

1. Attempt any 5 question out of 7 questions.
 2. Answers to all sub questions should be grouped together.
 3. Assume Suitable data if necessary and state it clearly.
- msm*

Q.No.	Questions	Points	CO	BL	Module No.
1	a. Write a note on BOLT contract.	5	1	2	1
	b. Compare between Contract and agreement.	5	1	4	1
	C. Explain in detail Indian Contract Act 1872.	10	2	2	3
2	a. Discuss the common contract clauses in detail.	10	1	2	2
	b. Explain in detail Indian Arbitration and Conciliation Act 1996.	10	1	2	3
3	a. Evaluate the effectiveness of NCB in promoting local contractor participation.	10	3	5	4
	b. Discuss the rights and duties of various parties involved in construction contract.	10	1	2	2
4	a. Explain the role of post-implementation review in contract management.	10	3	2	5



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END SEM/RE-EXAM EXAMINATION -MAY/JUNE 2025

4	b. List the different FIDIC contract books and their intended use. Analyze how the risk allocation in FIDIC contracts affects both contractors and employers in different types of construction projects.	10	3	1,5	4
5	a. Design a checklist for the contract closure process that ensures all legal, financial, and operational aspects are properly addressed.	10	3	6	5
	b. Explain the necessities of managing change in contract management. Also give the ideal process for managing change in contract.	10	3	2,3	5
6	a. You are the project manager responsible for negotiating a consultancy contract for a large infrastructure development. The client has asked you to include a clause addressing the allocation of risks between the consultant and the client. What are the main risks associated with consultancy contracts in engineering projects, and how would you propose to allocate these risks between the consultant and the client?	10	3	3	6
	b. Explain different types of Dispute resolution methods in construction projects.	10	2	2	3
7	a. Discuss the importance of integrity in contract management. How can lack of integrity affect the performance and outcome of a contract?	10	3	2,5	6
	b. What is an injunction in contract management? Discuss its types and the legal conditions under which a court may grant an injunction to enforce or restrain contractual actions.	10	3	2,3	6